THE DIRECTOR'S REPORT

The Arnold Arboretum During the Fiscal Year Ended June 30, 1961

The Staff:

It is with regret that we record here the death of Joseph Horace Faull, professor of forest pathology, *emeritus*. Professor Faull joined the staff of the Arnold Arboretum on July 1, 1928. A special laboratory was built for this area of research on the grounds of the Bussey Institution, and within a few years a greenhouse was added. Professor Faull, his students, and associates were among the first to recognize the significance of an arboretum with its massed collections of related species as a locale for the study of diseases of ornamental plants. To him and his team must go credit for the early work involving a service to the public in the identification and control of plant diseases now commonly carried on by state and federal experiment stations. From his laboratory came the early identification of a disease first found in this country in Ohio and now known as the Dutch elm disease. He warned prophetically of the danger of this fungus. In the course of his work, he and his students published studies of the fungal diseases of many genera of ornamental plants, including *Gleditsia*, *Cornus*, *Abies*, *Pinus*, *Picea*, and *Fagus*. Dr. Faull taught a class in forest pathology in Harvard College and guided the programs of nearly a dozen graduate students, many of whom have also achieved success in their field. Dr. Faull retired in 1940 but remained active in his laboratory for several additional years. Regrettably his position vacated during a shortage of skilled personnel concurrent with World War II could not be immediately filled and after the war was not continued due to a lack of funds. Dr. Faull's extensive herbarium of fungus diseases of cultivated plants was transferred to the Farlow Herbarium in Cambridge. Dr. Faull died on June 30, 1961, at the age of 91. A biographic report of his life will be prepared by his daughter, Dr. Anna Faull, for publication in a later issue of the *Journal of the Arnold Arboretum*.

On January 1, 1961, Mr. Peter S. Green joined the staff of the Arboretum. Formerly scientific officer at the Royal Botanic Garden, Edinburgh, Scotland, Mr. Green has been studying various genera of the Oleaceae, his special interest being in the cultivated genera *Osmanthus* and *Jasminum*. Mr. Green will continue his studies in this family, while at the same time serving as a horticultural taxonomist.

Dr. George K. Brizicky was appointed jointly with the Gray Herbarium to work with Dr. Wood on the flora of the Southeastern States. Dr. Brizicky replaces Dr. Kenneth A. Wilson, who resigned to accept a position at San Fernando Valley State College, Northridge, California.

Mr. Don M. A. Jayaweera, director of the Royal Botanic Garden, Peradeniya, Ceylon, and the holder of a Rockefeller Foundation Fellowship, was appointed as a Research Fellow at the Arboretum for the fiscal year. Mr. Jayaweera has worked with staff members in the herbarium on taxonomic problems of some cultivated and native plants of Ceylon and adjacent areas. He is also revising some of his work on the orchids of Ceylon through the use of the Orchid Herbarium of Oakes Ames, housed in the Harvard University Herbarium building.

Mr. Peter Tigerstedt, co-director of the Mustilla Arboretum, Mustilla, Finland, was appointed as the first Mercer Fellow at the Arnold Arboretum for the spring semester. Mr. Tigerstedt is the grandson of the founder of the Mustilla Arboretum who in the early days of the Arnold Arboretum was a correspondent of Charles Sargent. The Mustilla Arboretum, which is the northernmost in Europe, has received many plants from the Arnold Arboretum in past years. Mr. Tigerstedt took part in a variety of the activities of the Arboretum staff to acquaint himself with our methods and procedures.

The promotion of Dr. Lorin I. Nevling, Jr., to the position of associate curator of the herbarium was recommended and approved. Dr. Nevling also serves as assistant editor of the *Journal of the Arnold Arboretum*.

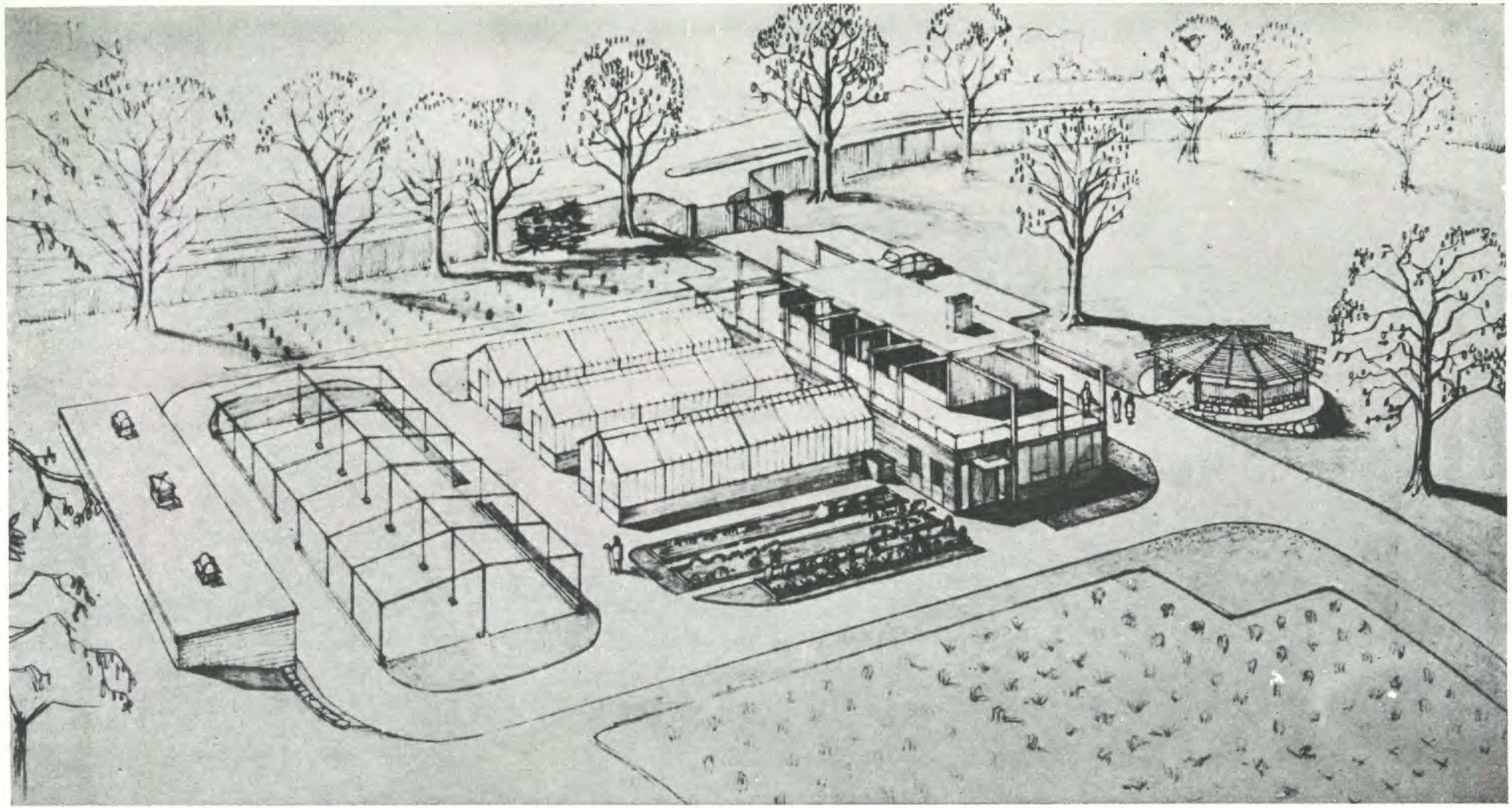
It is a special pleasure to record the honors awarded to several staff members. At the fiftieth anniversary of the College of Forestry, at Syracuse University, Irving W. Bailey, professor of plant anatomy, *emeritus*, was honored with the degree of Doctor of Science, *honoris causa*, with the following citation:

> IRVING WIDMER BAILEY, your name is synonymous with the role of research in the development of forestry. Your dedication to truth, zeal in research, and capacity to see the unexpected are gifts you have used to enhance and ennoble all the lives you have touched. Your solid and creative scholarship still guides and challenges forestry research. We honor you as forestry's preeminent wood anatomist and botanist and a truly inspired teacher."

Professor Karl Sax, professor of botany, *emeritus*, was honored on November 11, 1960, with a citation from the American Horticultural Council in annual meeting at Pasadena, California. Special notice was given to the many contributions in cytology and genetics and to the breeding of ornamental plants completed by Dr. Sax while an active staff member of the Arboretum.

Dr. Donald Wyman, horticulturist, was elected president of the American Horticultural Society for the coming year.

Two other resignations were accepted during the year. Miss Ann Close, business secretary, resigned and was replaced by Miss Anne Woolf. Miss Ann Waterman, assistant librarian, resigned to accept a position as librarian at the Pennsylvania Horticultural Society.



Architect's drawing of the proposed headhouse, greenhouse and associated construction to be built at 1050 Centre Street, Jamaica Plain, Massachusetts.

Horticulture:

Throughout the history of the Arnold Arboretum various directors have pointed out that in its location in the vicinity of Boston its plants are subjected to one of the most arduous and variable environments of any of the world's arboreta. Few areas of the world can show the vagaries of climatic conditions which our plants experienced during the past year. A summer of subnormal heat and rainfall was followed by the effects of hurricane "Donna" which hit the collections of the Arnold Arboretum on September 12, 1960. Although in comparison with hurricanes of previous years the loss was slight, our plants experienced severe branch damage which kept two tree pruners busy throughout the fall and winter months repairing and protecting the trees and shrubs affected by the strong winds. Although only thirteen trees were broken to a degree that required their removal, as frequently happens, three of these were trees familiar to the general public in conspicuous places on the grounds. The disfigurement of trees through the loss of branches, however, was severe. There are lasting effects of hurricanes in injury to root systems, and the growth of damaged specimens is generally poor in succeeding years. The superintendent and his staff succeeded in pulling to an erect position several dozen trees blown over by the storm.

Although we were fortunate in having a mild winter at first, allowing these plants to become re-established, our New England winter demonstrated once again the severity of environmental conditions in the area after the first of the new year. During February and March the Boston area experienced a record-tying cold spell when the temperature in Jamaica Plain did not rise above the freezing mark for twenty-six successive days. Subzero temperatures at night were frequent both during the period and in the days that followed. Fortunately, a heavy snowfall was on the ground during this period, and this, coupled with the heavy mulch which the staff deems desirable around the plants, protected the root systems. As a consequence this spring, irregular flowering or a complete lack of flowering in many plants that form flower buds in late summer and fall, the death of branch systems which necessitated heavy pruning, and the complete loss of many of the more tender species, were found. Throughout the "spring season" the Arboretum collections appeared to be behind what is considered the normal sequence of development. Much remains to be learned from continuing observation and recording of environmental conditions and subsequent flowering of plants in the Arboretum collections. The development of new greenhouse facilities for the Arboretum should allow not only the experimental duplication of some of these unusual environmental effects but a complete testing of the variations in the handling of such plants as an aid to their survival in our area.

The approval in principle by the President and Fellows of Harvard University as trustees of the Arnold Arboretum for the construction of a headhouse and new greenhouses for the Arboretum was reported last

year. During the current fiscal year much time and effort have been spent on this development, and it is a pleasure to report that construction is now under way. The firm of Griswold, Boyden, Wylde and Ames, of Boston, was selected as the architects and approved by the Corporation. The plans developed were discussed and checked with the staff members involved in each field, for the new greenhouse will house the propagation staff, a laboratory suitable for morphological, cytological, and genetical investigations, and a conference room for staff meetings and discussions. The main building (the headhouse) is designed to facilitate work in the area of propagation of woody plants, equipped as it will be with cold chambers for experimentation for hardiness, seed dormancy, flower initiation, and general problems of plant growth as these are related to the Arboretum's interests. A small apartment will be located on a second floor to enable a staff member to live on the grounds and be associated with the continual care which nursery and greenhouse collections require. Three greenhouses (with space for a fourth) are provided with automatic controls, insofar as possible, offering several environmental areas for experimentation. A pit house with a mechanism for heating and cooling is capable of extending either a warm fall or a cold spring season and will offer numerous research possibilities. A hexagonal display house for *bonsai* and a shade house for nursery stock complete the construction plans. The entire area will be surrounded by a chain link fence which hopefully will afford a security lacking in our present nursery area.

The new location, to be known as 1050 Centre Street, represents land acquired as three purchases in 1924, 1926, and 1927 from the Adams Nervine Hospital. Purchase at that time was by means of special contributions for the purpose. Regrettably, all of the top soil had been removed from one area prior to its sale, and in recent years this land has been of little value. Currently a program is under way to replace the top soil and to build up the fertility of the area for its future use for nursery or display plants. Fortunately, an abundance of top soil, which can be used for regrading the greenhouse area, has been encountered in the excavations for the basement of the headhouse and for the pit house. A new road will be constructed from the Arboretum proper, departing from the existing road system near the upper part of the lilac collection. This entrance will reduce the need to enter or depart from the busy Centre Street section.

The new greenhouses will allow a further development of many aspects of the work of the Arboretum staff. The greenhouses will not contain display collections and will not normally be open for public inspection but will function in the scope of the indenture which established the Arnold Arboretum for the growth and study of plants hardy to New England and for the research of the staff. The construction of the greenhouses at this time without a special financial drive for construction funds is possible by the use of the income from the bequest of Mrs. William Dana Mercer. A suitable plaque is planned for the interior of the building. A ground-breaking ceremony was held on May 12th during

a meeting of the Board of Overseers' Committee to Visit the Arnold Arboretum. Token shovels of soil were lifted by Dr. Bradford Washburn, chairman of the committee; Dr. Nathan M. Pusey, president of Harvard University; Dr. George M. Taylor, director of the Royal Botanic Gardens, Kew, both as a member of the Visiting Committee and in behalf of other arboreta; Mr. Martin Walsh, chairman of the Board of Park Commissioners of the City of Boston; and by Dr. Howard, director, for the Arboretum staff. Construction and occupancy are expected to be completed during the next fiscal year.

Breaking ground for the new greenhouses of the Arnold Arboretum, May 12, 1961. Front, left to right: President Nathan M. Pusey, Mr. Martin F. Walsh, Dr. Bradford Washburn, Dr. George Taylor, and Dr. Richard Howard. Rear, left to right: Mr. Lincoln Boyden, Jr. (architect), Dr. Donald Wyman, Mr. D. M. A. Jayaweera, Mr. Chester E. Bond (contractor), and members of the Committee to Visit the Arnold Arboretum, including far right, Mr. Sidney Shurcliff.

In a continuation of the annual maintenance program for the Arboretum grounds the Department of Parks and Recreation of the City of Boston rebuilt or replaced all of the concrete and wood-slatted benches in the Arboretum. These reconditioned benches freshly painted a dark green make the grounds more attractive for the visitors. The department was also responsible for painting the gates to the Arboretum and for the replacement of defective fire hydrants within the grounds.

It is hoped in future years to continue to resurface many of the roads within the Arboretum and to complete the fencing of the property. Regrettably the Arboretum has never been completely fenced, and theft

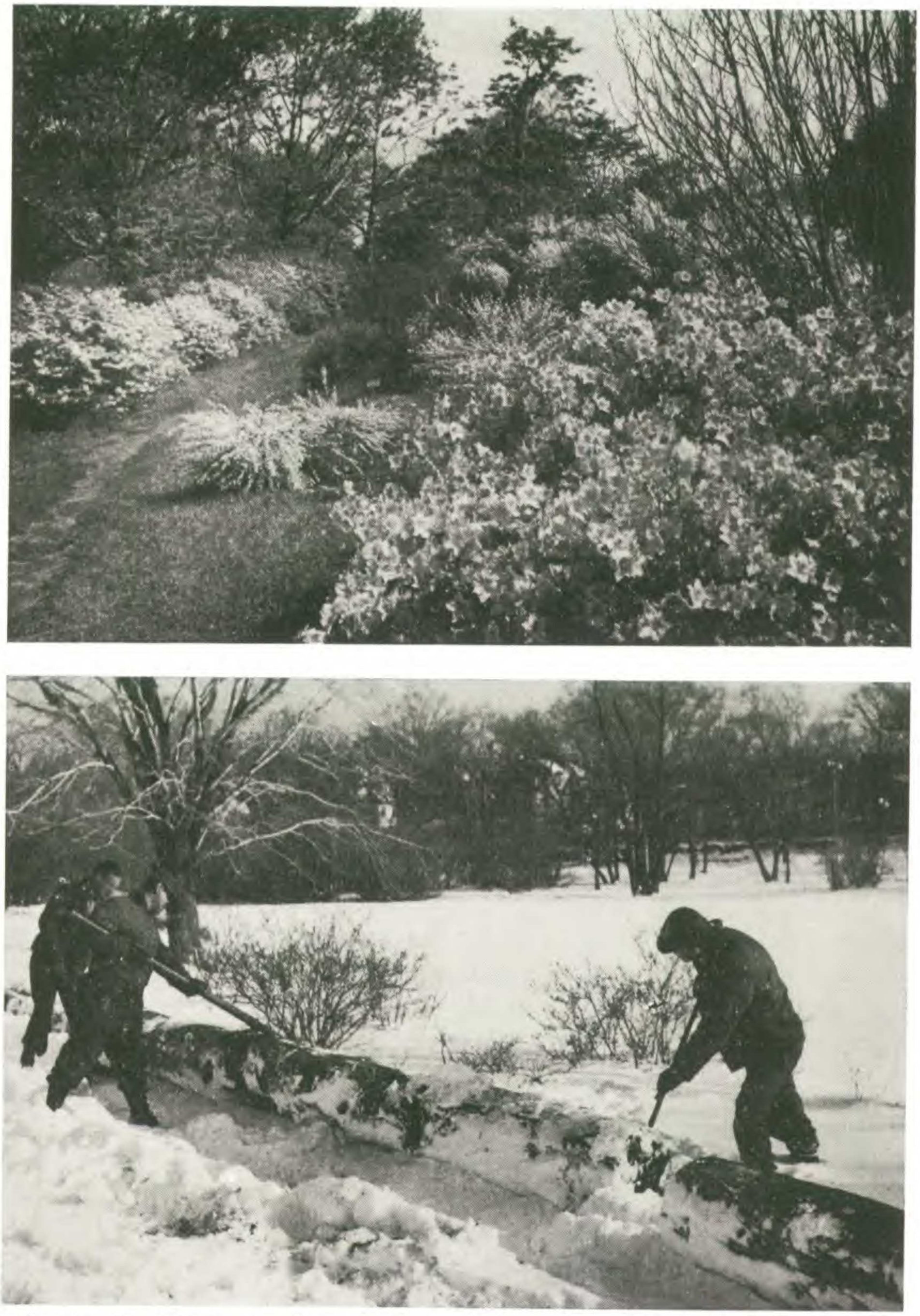
and vandalism continue. In spite of increased protection supplied by the Boston Police Department twenty-five choice evergreens were stolen during the year, some within twenty-four hours of being planted. Miscellaneous acts of vandalism continue and are annoying and expensive in the demands on staff time. Various steps for better protection are under consideration. Currently the roadway gates at the Arboretum are open from sunrise to sunset and the pedestrian gates continuously, although the staff is present only during the usual working hours. A staff police force or a restriction in the visiting hours may be required within the next few years, but a sizeable expenditure for fencing must be made first.

During the year about 280 species and cultivars were added to the Jamaica Plain collection from the nursery area in Weston. Included were approximately 60 *Rhododendron* plants which were added to the steep bank-planting on Hemlock Hill near the South Street gate. Additional selected lilac plants were placed near the walk in the lilac collection to continue a program of revising this collection to display all of the cultivars considered in the Lilac Committee's list of 100 best varieties. Additional plantings were made on the outcrop of Roxbury conglomerate known as the "rockery." It is hoped that dwarf plants and a heavier mulch will aid plants to survive in this difficult yet intriguing area. We were fortunate to continue to receive horse manure for the trucking and have added each week about six truck loads obtained from local stables. Smaller amounts of wood shavings, approximately one truck load per week, are donated for the hauling by a local lumber yard, and a truck load of cocoa shells was donated by the Hershey Chocolate Company with delivery supplied.

The hedge collection located near the Bussey Building has received special attention during the year. It is planned to relocate this collection near the new greenhouses. Ground has been prepared for these plants and the old collection has been root pruned in preparation for moving.

In October 1960, the Arboretum staff was notified that legislation filed by Representative James J. Craven, Jr., of Ward 19, had been approved by the General Court. This act provided for a swap of land involving a 17-acre tract of property owned by Harvard but adjacent to Arboretum property, between South Street and the New Haven Railroad for land owned by the Metropolitan District Commission in Randolph, Massachusetts, and a cash settlement. The Randolph property would then be used by the Medical School with another cash settlement to the Arnold Arboretum. There was considerable publicity during the election campaign of the benefits to the public of the playground and picnic area planned adjacent to the Arboretum. Although this transfer of land title may occur eventually, legal considerations have delayed positive action. All of the *Salix* and *Populus* species which grow in the marshy tract have been propagated for replanting elsewhere on the grounds.

Many of the activities of the propagator and his assistants were concerned with the design and the future relocation of the greenhouse. Thus,



ABOVE: A portion of the collections of *Rhododendron* and *Cytisus* species on Bussey Hill.

BELOW: Placing a barrier to protect small plants against sledding.

during the year 363 taxa in our general collections were propagated, these representing plants too large to be moved, plants needing replacement due to age or condition, or plants represented by insufficient individuals in our general plantings. In addition, another 103 taxa were propagated

from our general collections in response to specific requests from other gardens or individual scientists. The Arboretum staff members made requests for propagating material of 116 taxa for use in experimental or taxonomic or cytological studies. The propagator has also collaborated with the taxonomists in supplying information on propagation to be published with taxonomic studies of cultivated plants. For experimental projects involving the hardiness of cuttings or young plants 76 taxa were processed, and 104 taxa as seeds and 49 taxa as cuttings were subjected to experimental procedures for information relative to improving techniques of propagation of these taxa. During the fiscal year a total of 270 shipments of plant material comprising 1105 taxa was sent to co-operating nurseries and other arboreta in the United States and twelve other countries. Of these, 190 were sent as seeds and 915 as cuttings or plants, indicating the growing need and desire for reliable propagating material to represent the taxon and the lessening interest in seeds with their possibilities for hybrid contamination. From other sources representing the United States and 21 other countries, the Arboretum received 227 shipments of living plants or propagating materials comprising 705 taxa and 47 shipments of seeds of 118 taxa.

Experimental work conducted in the greenhouses concerned the germination of various kinds of seeds, the rooting of cuttings or plants usually propagated by grafting or considered difficult to root, and additional work on the length of storage time that cuttings of different taxa may be held under different conditions. In co-operation with the work of Mrs. Claude Weber on *Chaenomeles*, Mr. Fordham determined that a stratification of two months at 41°F. was the best method for producing a uniform stand of seedlings most quickly. Seeds of the fringe tree (*Chionanthus retusus*) responded most satisfactorily to three months of warm stratification, followed by three months of cold stratification at 41°F. A similar treatment applied to seeds of *Hamamelis mollis* proved equally successful to the five month warm period usually recommended.

Special attention has been given to several members of the Hamamelidaceae. Experimental work with the rooting of cuttings of *Parrotia* showed that grafting these plants as most nurseries do traditionally is not necessary. Cuttings taken from a 79-year-old specimen of *Parrotia persica* in the Arboretum collection on June 23, treated with Hormodin No. 2 or No. 3, and maintained with bottom heat of 73°F. under plastic had rooted 100% by September 10. A control lot without hormone rooted only 14%. Rooting at this time was heavy and the plants could have been removed and potted earlier. The potted plants produced additional growth before going dormant, and all survived the winter, an unusual condition for *Parrotia* which has a reputation for poor survival of rooted cuttings.

The house at 383 South Street formerly occupied by Professor Johnston was renovated, including modernization of the plumbing, painting of the exterior, and roofing, as a portion of our program of building maintenance.

Case Estates:

During the year an increase in the number of visitors to the Case Estates in Weston has become evident. The annual "open house" held in early May was well publicized to the "Friends of the Arboretum" and in the papers of adjacent communities. The attendance was gratifying to the staff members on duty there to answer questions. Many of the visitors have made repeated visits for subsequent study. The ground cover plots and the perennial garden vie for principal interest. The Case Estates remain primarily a nursery area for the Arboretum, however. To increase the beauty of the grounds, surplus plants have been placed where they will be seen better by the visitors or those driving by. The spectacular flowering of *Malus* 'Henrietta Crosby' this year created traffic tie-ups on Wellesley Street as drivers slowed to admire this handsome row of ornamental apples. We anticipate that the developing plantings near the High School and along Ash Street will soon draw comparable interest.

This spring saw the first flowering of the test plots of *Narcissus* taxa planted by Dr. Helen Scorgie and other members of the New England section of the American Daffodil Society. Approximately a hundred varieties were in flower during the "open house," and Dr. Scorgie was kind enough to answer the many questions posed by the admirers of these plants.

An exhibit of Christmas decorations and the plant materials used in making them. Staged at Horticultural Hall, Boston, Massachusetts, November 28–December 2, 1960.

It was from the nursery areas that plants were sent to the "co-operating nurserymen" during the year. Young plants of *Buxus sempervirens* 'Vardar Valley,' *Cornus pumila*, *Euonymus europaeus* 'Red Cascade,' *Rhododendron* 'Mandarin Red,' *Sorbus cashmiriana*, and *Viburnum plicatum* 'Lanarth' were made available to 90 nurseries and arboreta which requested plants from a circulated list. Other surplus plants were again made available to the Department of Buildings and Grounds of Harvard University for plantings around university buildings in Cambridge. A large general collection was also given to Union College, Schenectady, New York, to increase the small arboretum maintained on that campus.

It has been pointed out previously that the Case Estates in Weston experience more severe cold than does the Arboretum proper in Jamaica Plain. During the past winter, specimens of *Deutzia* showed comparable die-back in each area due to the cold, but many clones of *Rhododendron fortunei* suffered more in Weston than did comparable plants in Jamaica Plain.

The wildlife of the area is again on the increase and the destructive effects of rabbits and woodchucks were evident after the winter snow disappeared. Deer have been seen on the property on two occasions; pheasants are numerous; and a covey of quail appeared again for the first time in several years.

Land was again made available to staff members of the Bussey Institution and the Cabot Foundation of Harvard for growing experimental plants in Weston.

Education:

Only one formal course was offered during the spring semester when Dr. Howard taught a class in horticultural taxonomy in Harvard College. Dr. Thomas offered special work in cytotaxonomy to a group of graduate students working both in Cambridge and with the living collections in Jamaica Plain. The staff participated in the regular series of weekly seminars on taxonomic subjects.

Four classes were offered to the general public at Jamaica Plain or Weston in the fall, two field classes in the spring, and a class in propagation which met at appropriate intervals during the year. During the spring semester a lecture series was offered evenings in the Administration Building and was well attended. These lectures, designed to be semitechnical in nature, were presented by various staff members and research fellows.

The usual service of guided tours of the Arboretum plantings both in Jamaica Plain and Weston was accepted by many garden clubs, women's clubs, and civic groups during the fall and spring seasons. The spring tour offered jointly by the Massachusetts Horticultural Society and the Arboretum drew a large crowd which was accommodated in eight busses. A staff member in each bus led the groups through some of the more floriferous areas of the Arboretum while explaining the plants and

answering questions. These trips seem to be particularly worth while, for a large percentage of the people return for more leisurely walks alone or with smaller groups.

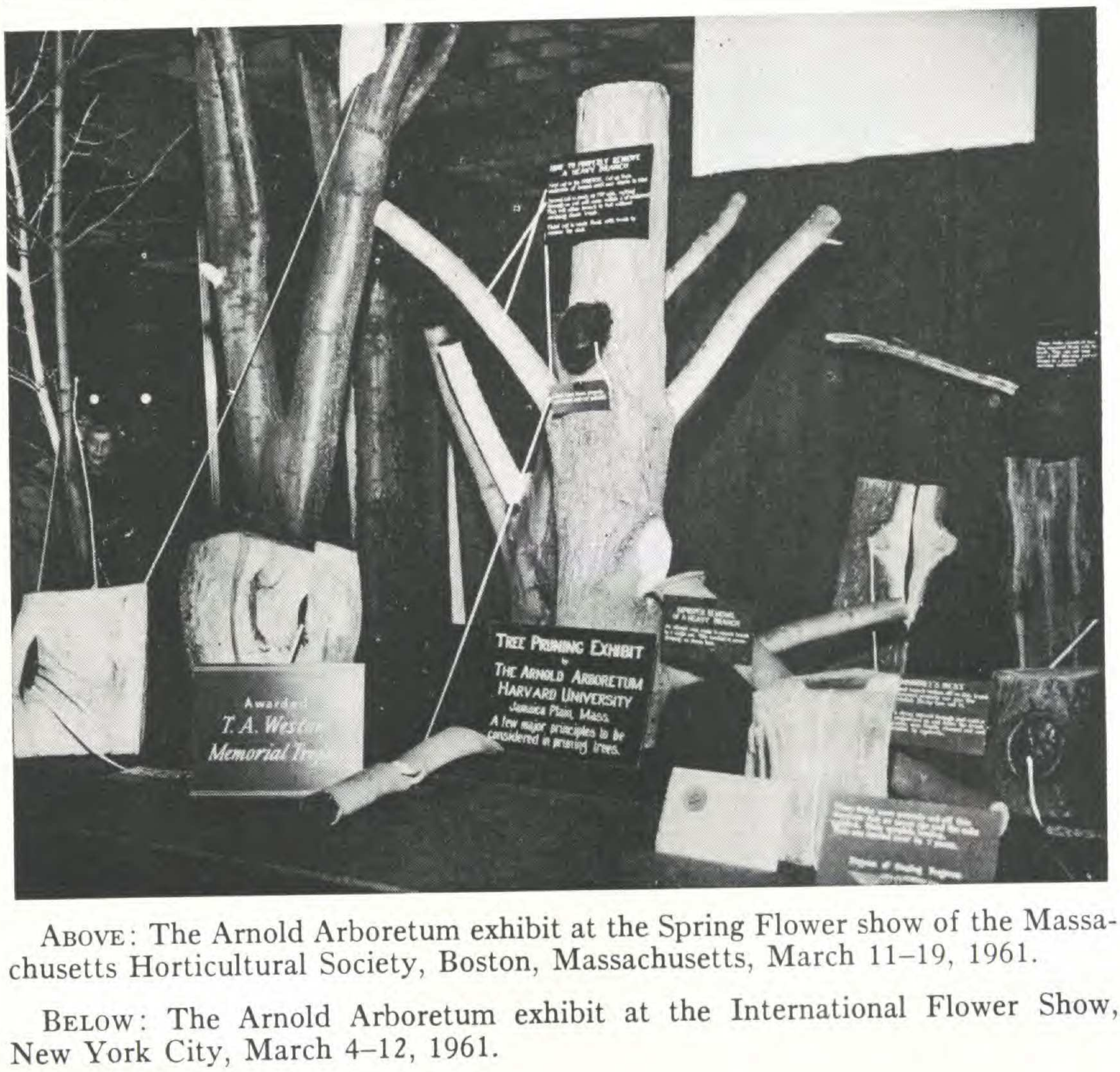
Arboretum staff members spoke to many garden clubs, horticultural groups, and similar organizations during the year. In addition, a set of kodachrome slides of the plants and activities at the Arboretum with a printed commentary was made available to other groups for their own programming. Dr. Wyman was the principal speaker at the thirtieth anniversary luncheon of the Holden Arboretum in Cleveland, Ohio. Dr. Wagenknecht described registration procedures at the organizational meeting of the American Boxwood Society in Boyce, Virginia, and at the annual meeting of the New England section of the American Society of Horticultural Science. Mr. Fordham presented a paper on double-dormant seeds at the Plant Propagators' annual meeting at Cleveland. Dr. Wood presented a series of lectures in a program in plant evolution in the Department of Biology at Vanderbilt University, Nashville, Tennessee. Drs. Perry and Hu presented papers at the annual meeting of the Society for Economic Botany held in Boston. Dr. Howard spoke on the campuses of Union College, in Schenectady, New York, and Mount Mercy College, in Pittsburgh, Pennsylvania, under the sponsorship of the American Institute of Biological Sciences. He also opened the lecture series at Longwood Gardens, was a speaker at the annual meeting of the New England Nurseryman's Association, and presented the commencement address at the graduation exercises at the State College, Bridgewater, Massachusetts.

Exhibits and Displays:

Five flower-show exhibits were prepared by the Arboretum staff during the winter and spring. A display of Christmas decorations and the plants comprising them, formerly held in the Administration Building in Jamaica Plain, was staged at Horticultural Hall, Boston, in co-operation with the Massachusetts Horticultural Society. When held previously at Jamaica Plain the show had had only a moderate attendance due to our more isolated location and the inadequate local transportation. Horticultural Hall proved to be an excellent location, however, and the exhibit was well attended. Members of several garden clubs under the leadership of Mrs. Donald Wyman prepared swags, wreaths, decorations, and arrangements, while the Arboretum staff prepared specimens and descriptive data of the plant materials involved.

The Arboretum exhibit at the Massachusetts Horticultural Society's Spring Flower Show showed numerous cultivated plants in their area of origin. A Mercator projection map of the world, 40 feet by 10 feet allowed small plants to be placed in that section of the world where each plant was native. One hundred and seventy-eight plants could be accommodated in this educational exhibit. It was awarded a first prize and a gold medal.

The Arboretum's tree pruning exhibit was set up at the International Flower Show of the New York Horticultural Society held in the Colli-



ABOVE: The Arnold Arboretum exhibit at the Spring Flower show of the Massachusetts Horticultural Society, Boston, Massachusetts, March 11–19, 1961.

BELOW: The Arnold Arboretum exhibit at the International Flower Show, New York City, March 4–12, 1961.

seum. Mr. Robert Williams, superintendent of buildings and grounds, receives full credit for this informative exhibit which won a first prize, a gold medal, and the T. A. Weston trophy for the most educational exhibit in the show.

The Arnold Arboretum *bonsai* collection was displayed in Detroit, Michigan, for the flower show of the Michigan Horticultural Society. The dwarf plants displayed in an oriental setting won a gold rosette, the highest award of the show.

Finally, in late spring, the New World portion of the exhibit used for the Massachusetts Horticultural Society show was reconstituted using later flowering materials and was exhibited by request at the flower show sponsored by the Federated Garden Clubs of Massachusetts at the Jordan Marsh Company, Boston.

Comparative Morphology:

Professor I. W. Bailey served again this year as curator of the wood collection. His continuing care and interest are greatly appreciated. During the year a sizeable number of wood samples were made available to the Quartermaster Research and Engineering Command, U.S. Army, for a specific chemical analysis of cellulase inhibitors, a program of research conducted at their headquarters in Natick, Massachusetts. In addition, requests for wood samples of various genera and families were received from fourteen individuals and institutions and all were filled as completely as possible.

The research program of Professor Bailey, supported in part by a grant from the National Science Foundation, continues to concern the putatively primitive leaf-bearing genera of the Cactaceae. Papers summarizing his research will continue to appear in the *Journal of the Arnold Arboretum*.

Dr. Uttam Prakash, of the Birbal Sahni Institute of Palaeobotany, Lucknow, India, has been a visiting scholar for a second year and has continued to use the wood and slide collections of the Arboretum in connection with his investigations of fossil floras of the state of Washington.

Library:

The attention of the librarians was devoted in considerable extent to a reorganization of the horticultural section of the library located in Jamaica Plain. The books formerly shelved on the second floor of the herbarium were moved to the third floor and rearranged on the shelves in the main reading room and in the alcoves, thereby freeing the second floor space for an increase in the herbarium of cultivated plants.

Three hundred and twenty-three volumes were added to the library, increasing the total to 51,106 on June 30, 1961. Nine hundred and seventy-two pamphlets were added to the monographic collection, making a total of 18,302. A total of 2,182 catalogue cards was added to the main file. Two hundred and seven books were bound or rebound, and fifty old

books given special restoration service. Miscellaneous indices also received their regular accessions. Three thousand cards were added to the Gray Herbarium Card Index of American Plants, 4,000 cards to the Torrey Index of American Botanical Literature, and approximately 700 cards to the Rehder index of cultivated plants. Sets 12–14 of the Index Nominum Genericorum were also filed.

Japanese *bonsai* of the Lars Anderson Collection of the Arnold Arboretum on exhibition at the Flower Show of the Michigan Horticultural Society, Detroit, Michigan, February 25–March 5, 1961.

Although "Xerox" reproduction service became available through the Widener Library and was recommended whenever possible, 120 books nevertheless were sent out on Interlibrary loan. Twenty-five books were borrowed from other libraries.

Herbarium:

During the year 12,208 specimens were mounted and added to the herbarium, bringing the total collection to 726,344 specimens on June 30, 1961. During the same period 17,232 specimens were received through exchange, gift, subsidy, or for identification. This year the largest number represented a subsidized collection made by Dr. Hugh M. Raup in the Mackenzie Basin of Canada in 1938. A sizeable collection of native and cultivated plants of Japan was purchased from Mr. Miyoshi Furuse. A total of 3,345 specimens was distributed to other institutions in exchange.

The staff filled 113 requests for herbarium specimens on loan, representing 14,614 specimens sent to 65 institutions, forty-three of these in the United States. The staff requested 65 loans totaling 3,399 specimens

for study from 38 institutions, including twelve in the United States. The incoming loans averaged 52 specimens, while the outgoing loans averaged 129 specimens.

The additions to the herbarium of cultivated plants housed in Jamaica Plain have now reached the point where many of the cases are crowded. Fortunately, space for expansion is available, and new steel herbarium cases have been ordered. A general shift of this herbarium is being planned. Much of the material added to the cultivated herbarium represents cultivated herbaceous plants or exotic greenhouse plants. We appreciate very much a large exchange of specimens from the comprehensive collections of the Longwood Gardens, nearly all of which represent new genera or species for our herbarium. This material will assist materially in the routine identifications of many of the specimens sent to us for naming.

The publications of the taxonomists cited in the bibliography of the staff clearly indicate the diversity of area and plant groups represented in their research.

Travel and exploration:

The Arboretum was represented at various annual science meetings in several parts of the country by staff members. These meetings included those of the American Association of Botanical Gardens and Arboretums, the American Institute of Biological Sciences, the American Horticultural Council and American Horticultural Society, the Plant Propagators Society, the Society for Economic Botany, the National Shade Tree Conference and the American Society of Horticultural Science.

Field work was undertaken by Dr. Howard, in Montserrat, St. Croix, and Redonda; by Dr. Wood, in central Florida with Dr. George R. Cooley; by Dr. Wagenknecht, in Virginia and North Carolina; and by Dr. Thomas, in Florida and Alabama. In all cases, herbarium specimens and living plant materials were brought back for addition to the Arboretum collections.

Dr. Kobuski spent two months in Europe visiting herbaria in Scotland, England, Switzerland, and Sweden in connection with his principal research interest in the Theaceae and was engaged especially in the examination of types and other herbarium materials of the Old World species of *Ternstroemia* which he is revising.

The Arboretum has also contributed to the support of several collectors working in Japan; to an expedition of Mr. James Keenan, of the Royal Botanic Garden, Edinburgh, to Burma; and to the work of Mr. Theodore Dudley, in Turkey. These areas may yield plants of horticultural value to the Arboretum and specimens for the herbarium.

Gifts and grants:

The annual appeal to the Friends of the Arnold Arboretum received its usual generous response. To all of these contributors we extend the

appreciation of the staff for the support which makes possible extra services to the area of horticulture. A special gift from Dr. George R. Cooley supports the work of Dr. Wood and his collaborators on the generic flora of the southeastern states.

During the year we have received an unusually large number of books, pamphlets, and research materials for the library from the estate of Dr. Franklin P. Metcalfe, and from Mrs. Susan D. McKelvey, Mr. P. Bernat, Dr. H. Field, and Dr. A. F. Hill. These contributions materially increase the value of our library and pamphlet collections.

Plant materials have been received in exchange from many sources, but the gift of living plants for the education classes received from Mr. Robert Pirie, of Hamilton, Massachusetts, is particularly appreciated. I also wish to acknowledge the assistance of the many individuals who have supplied propagating material, photographs and information in response to specific requests for research projects of the staff. The largest number of requests concerned the monograph of *Chaenomeles* being prepared by Mrs. Claude Weber.

Publications:

The regular publications of the Arnold Arboretum include the quarterly *Journal of the Arnold Arboretum* and *Arnoldia*, which is issued at irregular intervals. Both appeared as planned. A double number of *Arnoldia* issued during December, 1960, comprised a revision by Dr. Wyman of his earlier publication, "How to Establish an Arboretum or Botanical Garden." The first edition of this article is out of print, and the demand for reprints of the revised edition exceeded all expectations.

Five numbers of *Arnoldia* dealt with the registration lists of cultivar names and the problems of preparing such lists. The council of the American Association of Botanical Gardens and Arboretums requested 175 extra copies of each list for distribution to its membership, and many additional requests for reprints from nurserymen indicate the interest in these bibliographic listings. To the present, registration lists for cultivar names in *Cornus*, *Gleditsia*, *Forsythia*, *Liquidambar*, and *Pieris* have been published.

The librarian was also responsible for the photoprint reproduction and the distribution of Shaw's *Pines of Mexico*. Published originally by the Arboretum in a limited edition, this work has long been out of print. To date, the sales of the photoprint reproduction have exceeded the distribution of the original printing.

This report would not be complete without acknowledging the efforts of Miss Ethel Upham, of East Woodstock, Connecticut, who for many years has painstakingly prepared the index for the *Journal of the Arnold Arboretum*. Miss Upham has now relinquished this arduous but invaluable task which passes from her capable hands to others.